

SEQUENCE LISTING

<110> Chan, Chung
Zamost, Bruce L.
Covert, Douglas C.
Liu, Hong Y.
De Jongh, Karen S.
Meyer, Jeffrey D.
Holderman, Susan D.

<120> IL-21 PRODUCTION IN PROKARYOTIC HOSTS

<130> 02-12

<160> 42

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 642

<212> DNA

<213> Homo sapiens

<220>

<221> CDS

<222> (47)...(535)

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Met Arg Ser
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Ser Pro Gly Asn Met Glu Arg Ile Val Ile Cys Leu Met Val Ile Phe
5 10 15

ttg ggg aca ctg gtc cac aaa tca agc tcc caa ggt caa gat cgc cac 151
Leu Gly Thr Leu Val His Lys Ser Ser Ser Gln Gly Gln Asp Arg His
20 25 30 35

atg att aga atg cgt caa ctt ata gat att gtt gat cag ctg aaa aat 199
Met Ile Arg Met Arg Gln Leu Ile Asp Ile Val Asp Gln Leu Lys Asn
40 45 50

tat gtg aat gac ttg gtc cct gaa ttt ctg cca gct cca gaa gat gta 247
 Tyr Val Asn Asp Leu Val Pro Glu Phe Leu Pro Ala Pro Glu Asp Val
 55 60 65

gag aca aac tgt gag tgg tca gct ttt tcc tgt ttt cag aag gcc caa 295
 Glu Thr Asn Cys Glu Trp Ser Ala Phe Ser Cys Phe Gln Lys Ala Gln
 70 75 80

cta aag tca gca aat aca gga aac aat gaa agg ata atc aat gta tca 343
 Leu Lys Ser Ala Asn Thr Gly Asn Asn Glu Arg Ile Ile Asn Val Ser
 85 90 95

att aaa aag ctg aag agg aaa cca cct tcc aca aat gca ggg aga aga 391
 Ile Lys Lys Leu Lys Arg Lys Pro Pro Ser Thr Asn Ala Gly Arg Arg
 100 105 110 115

cag aaa cac aga cta aca tgc cct tca tgt gat tct tat gag aaa aaa 439
 Gln Lys His Arg Leu Thr Cys Pro Ser Cys Asp Ser Tyr Glu Lys Lys
 120 125 130

cca ccc aaa gaa ttc cta gaa aga ttc aaa tca ctt ctc caa aag atg 487
 Pro Pro Lys Glu Phe Leu Glu Arg Phe Lys Ser Leu Leu Gln Lys Met
 135 140 145

att cat cag cat ctg tcc tct aga aca cac gga agt gaa gat tcc tga 535
 Ile His Gln His Leu Ser Ser Arg Thr His Gly Ser Glu Asp Ser *
 150 155 160

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 ctttgtattc caagtggagg agccctatta aattatataa agaaata 642

<210> 2

<211> 162

<212> PRT

<213> Homo sapiens

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 Asp Arg His Met Ile Arg Met Arg Gln Leu Ile Asp Ile Val Asp Gln
 35 40 45

Leu Lys Asn Tyr Val Asn Asp Leu Val Pro Glu Phe Leu Pro Ala Pro
 50 55 60
 Glu Asp Val Glu Thr Asn Cys Glu Trp Ser Ala Phe Ser Cys Phe Gln
 65 70 75 80
 Lys Ala Gln Leu Lys Ser Ala Asn Thr Gly Asn Asn Glu Arg Ile Ile
 85 90 95
 Asn Val Ser Ile Lys Lys Leu Lys Arg Lys Pro Pro Ser Thr Asn Ala
 100 105 110
 Gly Arg Arg Gln Lys His Arg Leu Thr Cys Pro Ser Cys Asp Ser Tyr
 115 120 125
 Glu Lys Lys Pro Pro Lys Glu Phe Leu Glu Arg Phe Lys Ser Leu Leu
 130 135 140
 Gln Lys Met Ile His Gln His Leu Ser Ser Arg Thr His Gly Ser Glu
 145 150 155 160
 Asp Ser

<210> 3
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 <213> oligonucleotide ZC29740Artificial Sequence

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<210> 4
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 <213> Artificial Sequence

<220>
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<210> 5
 <211> 62
 <212> DNA

<213> Artificial Sequence

<220>

<223> oligonucleotide ZC29736

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gtggaattgt gagcggataa caatttcaca cagaattcat taaagaggag aaattaactc 60
cc 62

<210> 6

<211> 63

<212> DNA

<213> Artificial Sequence

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<223> oligonucleotide ZC29738

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ttc 63

<210> 7

<211> 62

<212> DNA

<213> Artificial Sequence

<220>

<223> oligonucleotide ZC29084

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<210> 8

<211> 68

<212> DNA

<213> Artificial Sequence

<220>

<223> oligonucleotide ZC22127

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gtgttcta 68

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<210> 10
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<210> 11
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<210> 12
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<210> 13
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<210> 15
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<220>
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<210> 16
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<220>
 <223> oligonucleotide ZC22964

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<210> 17
<211> 60
<212> DNA
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<220>
<223> oligonucleotide ZC22965

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<210> 18
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC22966

<400> 18
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<210> 19
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC22967

<400> 19
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<210> 20
<211> 60

<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC22968

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<210> 21
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC22969

<400> 21
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<210> 22
<211> 60
<212> DNA
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<220>
<223> oligonucleotide ZC22970

<400> 22
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<210> 23
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC22971

<400> 23

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<210> 24

<211> 40

<212> DNA

<213> Artificial Sequence

<220>

<223> oligonucleotide ZC22972

<400> 24

ttaatctgta tcaggctgaa aatcttatct catccgcaa 40

<210> 25

<211> 63

<212> DNA

<213> Artificial Sequence

<220>

<223> oligonucleotide ZC40133

<400> 25

ctcaacatct tccggagccg gcaggaattc cggaaccagg tcattcacat aatttttcag 60
ctg 63

<210> 26

<211> 64

<212> DNA

<213> Artificial Sequence

<220>

<223> oligonucleotide ZC40107

<400> 26

ttatagatat tgttgatcag ctgaaaaatt atgtgaatga cctggttccg gaattcctgc 60
cggc 64

<210> 27

<211> 405

<212> DNA

<213> Artificial Sequence

<220>

<223> optimized IL-21

<221> CDS

<222> (1)...(405)

<400> 27

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1 5 10 15	
att gtt gat cag ctg aaa aat tat gtg aat gac ctg gtt ccg gaa ttc	96
Ile Val Asp Gln Leu Lys Asn Tyr Val Asn Asp Leu Val Pro Glu Phe	
20 25 30	
ctg ccg gct ccg gaa gat gtt gag acc aac tgt gag tgg tcc gct ttc	144
Leu Pro Ala Pro Glu Asp Val Glu Thr Asn Cys Glu Trp Ser Ala Phe	
35 40 45	
tcc tgt ttc cag aaa gcc cag ctg aaa tcc gca aac acc ggt aac aac	192
Ser Cys Phe Gln Lys Ala Gln Leu Lys Ser Ala Asn Thr Gly Asn Asn	
50 55 60	
gaa cgt atc atc aac gtt tcc att aaa aaa ctg aaa cgt aaa ccg ccg	240
Glu Arg Ile Ile Asn Val Ser Ile Lys Lys Leu Lys Arg Lys Pro Pro	
65 70 75 80	
tcc acc aac gca ggt cgt cgt cag aaa cac cgt ctg acc tgc ccg tcc	288
Ser Thr Asn Ala Gly Arg Arg Gln Lys His Arg Leu Thr Cys Pro Ser	
85 90 95	
tgt gat tct tat gag aaa aaa ccg ccg aaa gaa ttc ctg gaa cgt ttc	336
Cys Asp Ser Tyr Glu Lys Lys Pro Pro Lys Glu Phe Leu Glu Arg Phe	
100 105 110	
aaa tcc ctg ctg cag aaa atg att cac cag cac ctg tcc tct cgt acc	384
Lys Ser Leu Leu Gln Lys Met Ile His Gln His Leu Ser Ser Arg Thr	
115 120 125	
cac ggt tcc gaa gat tcc tga	405
His Gly Ser Glu Asp Ser *	
130	

<210> 28
 <211> 134
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> optimized IL-21

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 Leu Pro Ala Pro Glu Asp Val Glu Thr Asn Cys Glu Trp Ser Ala Phe
 35 40 45
 Ser Cys Phe Gln Lys Ala Gln Leu Lys Ser Ala Asn Thr Gly Asn Asn
 50 55 60
 Glu Arg Ile Ile Asn Val Ser Ile Lys Lys Leu Lys Arg Lys Pro Pro
 65 70 75 80
 Ser Thr Asn Ala Gly Arg Arg Gln Lys His Arg Leu Thr Cys Pro Ser
 85 90 95
 Cys Asp Ser Tyr Glu Lys Lys Pro Pro Lys Glu Phe Leu Glu Arg Phe
 100 105 110
 Lys Ser Leu Leu Gln Lys Met Ile His Gln His Leu Ser Ser Arg Thr
 115 120 125
 His Gly Ser Glu Asp Ser
 130

<210> 29
 <211> 64
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> oligonucleotide ZC43,586

<400> 29
 acaatttcac acagaattca ttaaagagga gaaattaact atggatatta atactgaaac 60
 tgag 64

<210> 30

<211> 64
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide ZC43,587

<400> 30
tctgtatcag gctgaaaatc ttatctcatc cgccaaaaca tcatcgccat tgctcccaa 60
atac 64

<210> 31
<211> 1965
<212> DNA
<213> Artificial Sequence

<220>
<223> DNA sequence of the Red Recombinase operon
amplified with ZC43,586 and ZC43,587

<400> 31
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agaggcagaa ctggcagacg acatggaaaa aggcctgccc cagcacctgt ttgaatcgct 300
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atcaccactc ttcgccagac ggcattttaa ggtgatgcca gcgatgcgca gttcatcgca 600
ttactgatcg ttgccaacca gtacggcctt aatccgtgga cgaaagaaat ttacgccttt 660
cctgataagc agaatggcat cgttccggtg gtgggcgttg atggctggtc ccgcatcatc 720
aatgaaaacc agcagtttga tggcatggac tttgagcagg acaatgaatc ctgtacatgc 780
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atatttcgcc gcgacattcg tgcacgtca gaactgacac aggccgaagc agtaaaagct 1200
cttggattcc tgaaacagaa agccgcagag cagaagggtg cagcatgaca ccggacatta 1260
tcctgcagcg taccgggatc gatgtgagag ctgtcgaaca gggggatgat gcgtggcaca 1320

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aattacggct cggcgctcatc accgcttcag aagttcacaa cgtgatagca aaaccccgt 1380
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gcaccgggtg ggctccgga gttaacgcta aagcactggc ctggggaaaa cagtacgaga 1500
acgacgccag aaccctgttt gaattcactt ccggcgtgaa tgttactgaa tccccgatca 1560
tctatcgca cgaaagtatg cgtaccgcct gctctcccga tggtttatgc agtgacggca 1620
acggccttga actgaaatgc ccgtttacct cccgggattt catgaagttc cggctcgggtg 1680
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tcatcgaaaa aatggacgag gcactggctg aaattggttt tgtatttggg gagcaatggc 1920
gatgatgttt tggcggatga gataagattt tcagcctgat acaga 1965

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<210> 32

<211> 92

<212> DNA

<213> Artificial Sequence

<220>

<223> oligonucleotide ZC45,112

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gttggcgctt tcaggtcgag gtggcccggc tc 92

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<210> 33

<211> 99

<212> DNA

<213> Artificial Sequence

<220>

<223> oligonucleotide ZC45,171

<400> 33

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taattgactc attaagttag atataaaaaa tacatattca atcattaata cgattgaatg 60
gagaactttt attattgaag catttatcag gggtattgt 99

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<210> 34

<211> 1591

<212> DNA

<213> Artificial Sequence

<220>

<223> Tetracycline promoter::tetracycline gene

(tetp::tet) PCR fragment amplified with ZC45.112
and ZC45.171

<400> 34

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gagaactttt attattgaag catttatcag ggttattgtc tcatgagcgg atacatatatt 120
gaatgtattt agaaaaataa acaaataggg gttccgcgca catttccccg aaaagtgcc 180
cctgacgtct aagaaacatc tattatcatg acattaacct ataaaaatag gcgtatcacg 240
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ggggaataac tagccatttc aatgtaacaa t 1591

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<210> 35

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> oligonucleotide ZC45.357

<400> 35

tcattaagtt agatataaaa aatacatatt ca

32

<210> 36
 <211> 29
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> oligonucleotide ZC45,350

 <400> 36
 taattgttac attgaaatgg ctagttatt 29

 <210> 37
 <211> 27
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> oligonucleotide ZC45,353

 <400> 37
 atgaaatcta acaatgcgct catcgtc 27

 <210> 38
 <211> 22
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> oligonucleotide ZC45,355

 <400> 38
 tcaggtcgag gtggcccggc tc 22

 <210> 39
 <211> 27
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> oligonucleotide ZC45,354

 <400> 39
 tctaccgaga ctttatcggt tactcct 27

<210> 40
 <211> 28
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> oligonucleotide ZC45.359

<400> 40
 ttaaaatgtg tacttaagac cagcagta

28

<210> 41
 <211> 1585
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Sequence of the 1584bp PCR fragment amplified with
 primer set #1 (ZC45.357 and ZC45.350)

<400> 41
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 ttattattga agcatttatc agggttattg tctcatgagc ggatacatat ttgaatgtat 120
 ttagaaaaat aaacaaatag gggttccgcg cacatttccc cgaaaagtgc cacctgacgt 180
 ctaagaaacc attattatca tgacattaac ctataaaaaat aggcgtatca cgaggccttc 240
 tcatgtttga cagcttatca tcgataagct ttaatgcggt agtttatcac agttaaattg 300
 ctaacgcagt caggcacctg gtatgaaatc taacaatgcg ctcatcgta tcctcggcac 360
 cgtcaccctg gatgctgtag gcataggctt gggtatgccg gtactgccgg gcctcttgcg 420
 ggatatcgta cattccgaca gcatcgccag tcactatggc gtgctgctag cgctatatgc 480
 gttgatgcaa tttctatgcg caccggttct cggagcactg tccgaccgct ttggccgccc 540
 cccagtcctg ctgcgttcgc tacttgagac cactatcgac tacgcgatca tggcgaccac 600
 acccgtcctg tggatcctct acgcggagc catcgtggcc ggcatcaccg gcgccacagg 660
 tgcggttgct ggcgcctata tcgccgacat caccgatggg gaagatcggg ctgcgccactt 720
 cgggctcatg agcgcttggt tcggcgtggg tatggtggca ggccccgtgg ccgggggact 780
 gttgggcgcc atctccttgc atgcaccatt ccttgccgcg gcggtgctca acggcctcaa 840
 cctactactg ggctgcttcc taatgcagga gtcgcataag ggagagcgtc gaccgatgcc 900
 cttgagagcc ttcaaccag tcagctcctt ccggtgggcg cggggcatga ctatcgctgc 960
 cgcacttatg actgtcttct ttatcatgca actcgtagga caggtgccgg cagcgtctctg 1020
 ggtcattttc ggcgaggacc gctttcgctg gagcgcgacg atgatcggcc tgtcgttgc 1080
 ggtattcgga atcttgacg ccctcgctca agccttcgtc actggtcccg ccaccaaacg 1140
 tttcggcgag aagcaggcca ttatcgccgg catggcggcc gacgcgctgg gctacgtctt 1200
 gctggcggtc gcgacgcgag gctggatggc cttccccatt atgattcttc tcgcttccgg 1260

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cggcatcggg atgcccgcgt tgcaggccat gctgtccagg caggtagatg acgaccatca 1320
gggacagctt caaggatcgc tcgcggctct taccagccta acttcgatca ctggaccgct 1380
gatcgtcacg gcgatttatg ccgcctcggc gagcacatgg aacgggttgg catggattgt 1440
aggcgccgcc ctataccttg tctgcctccc cgcgttgcgt cgcggtgcat ggagccgggc 1500
cacctcgacc tgagaacgcc aactaaaatt tccccgaggt gaaaatcgcc ccggggaata 1560
actagccatt tcaatgtaac aatta 1585

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<210> 42

<211> 1191

<212> DNA

<213> Artificial Sequence

<220>

<223> Sequence of the 1190bp PCR fragment amplified
with primer set #2 (ZC45,353 and ZC45,355)

<400> 42

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